CROSS-GOAL STRATEGIES

Many of EPA's efforts—strengthening our partnerships with states and tribes, improving the quality and availability of the environmental and health information on which we base our decisions, and improving our management systems to achieve better results—contribute to our progress toward all five of our goals. This cross-Agency, cross-media work includes both support functions, such as administrative and financial management or legal services, and the strategies or means we employ to help accomplish our objectives, such as science and research or information management.

Each of these efforts is a significant component of our work and plays a critical role in the accomplishment of all of our goals. This chapter highlights a few of these cross-goal strategies: Partnerships, Information, Innovation, Human Capital, Science, and Homeland Security. For each, we will discuss the Agency's approach, explain how the strategy will contribute to the achievement of our goals, and describe some of the activities we will conduct and results we hope to achieve using this approach.

Partnerships

Since EPA was established, we have relied on collaborative partnerships with states and tribes to help us carry out our mission. The advances made in protecting our Nation's health and environment would not have been possible without the participation and support of state and tribal governments. EPA is committed to strengthening these partnerships and, recognizing the unique concerns and contributions that each of us brings to the table, to working together with state and tribal agencies to address environmental problems and achieve results. The discussion which follows outlines our approach to establishing and improving our partnerships with states and tribes.

State Partnerships

Most of the Nation's environmental laws envision a strong role for state governments in implementing and managing environmental and human health protection programs. As state environmental authority and management capacity have grown over the past three decades, EPA has delegated or authorized primary responsibility to states for implementation of many day-to-day environmental and human health protection program activities such as issuing permits, conducting compliance and enforcement programs, and monitoring environmental conditions. Direct administration of environmental and human health protection programs by states, with EPA oversight to ensure compliance with federal statutes and achievement of national objectives, has brought about significant improvements in the environment and human health across the country. State performance is critical to achieving both EPA and state goals and objectives.

In 1995, the states and EPA re-grounded their relationship by agreeing to a series of principles that would guide their work together. For the past 7 years, the principles articulated in the *Joint Commitment to Reform Oversight and Create the National Environmental Performance Partnership System*, also known as the "May 17th Agreement," have guided the state-EPA

partnership. These principles call upon the states and EPA to set priorities jointly; develop performance agreements to define their roles, responsibilities, and accountability; encourage innovative environmental and human health protection strategies; agree upon performance measures; and jointly evaluate the results achieved.

The states and EPA use a variety of tools to define their relationship and guide their implementation of the Nation's environmental laws and the principles of the "May 17th Agreement." These tools include performance partnership agreements (PPAs), categorical grants to states, performance partnership grants (PPGs), enforcement agreements, primacy delegation agreements, and others. In addition to the performance partnership system, EPA works with a variety of associations representing state environmental agencies, such as the National Governor's Association, the Environmental Council of the States (ECOS), and other pollution-media-specific organizations such as the Association of State and Interstate Water Pollution Control Administrators. EPA also works with state agricultural and public health agencies on environmental matters.

Key Principles
National Environmental Performance Partnership System
May 17, 1995 Joint Commitment

- Continuous Improvement.
- Environment Protected for All.
- Progress Reported Using Environmental Indicators.
- Allowing Flexible Approaches while Maintaining Level Playing Field.
- Joint Planning and Priority Setting to Address Highest Needs.
- Facilitate and Encourage Public Involvement.
- Reforming Oversight to Concentrate on Weaknesses.

The results of a joint system evaluation conducted by state environmental commissioners and senior EPA managers in 2002 confirm that Performance Partnerships are based on sound principles that guide a flexible process that adapts environmental goals to local conditions in a way that builds trust between states and EPA. Performance Partnerships have greatly improved communications between EPA and state environmental agencies by fostering more frequent discussions between state commissioners and regional administrators and by beginning to break down organizational and media-program barriers in both EPA regional offices and state agencies. Increased joint planning and priority-setting have focused state and EPA regional office efforts on achieving results, increased work sharing, allowed more flexibility in funding, and reduced low-value oversight and reporting.

Since establishment of the Performance Partnership System, our increased focus on partnering has led to other advancements in the state-EPA relationship. EPA's intensive and comprehensive work with states on information management includes grant programs for state environmental information efforts and the Information Exchange Network, which is increasing the speed at which we can share data, driving down costs, and improving efficiency and accuracy. State-EPA partnering efforts also yielded the 1997 State-EPA Regulatory Innovation Agreement.

EPA is also working with states to achieve greater value from PPGs. We are conducting a structured, disciplined three-part effort to evaluate barriers that prevent EPA and states from taking greater advantage of the flexibility that PPGs provide. First, we will identify and assess legal and administrative barriers. The next phase involves meetings between state and federal front-line grant managers and negotiators to develop plans for reducing barriers and increasing use of PPG flexibility. Then we will build on these efforts to develop a training module and a best practices guide. These

activities will greatly increase use of the flexibility that PPGs provide to states.

Progress toward all five of our *Strategic Plan* goals depends not only on EPA's efforts, but on the efforts of all 50 states, the District of Columbia, Puerto Rico, the Virgin Islands, and the Islands of the Pacific Insular areas. Therefore, effective partnerships with these jurisdictions are necessary for achieving the results contemplated in this *Plan*. Among the problems identified by the evaluation of the Performance Partnership System described above was that EPA's priority-setting and planning processes (including PPAs, issuance of national program guidance, budgeting, and accountability systems) are not aligned in a way that fosters joint planning and priority-setting across media program lines. EPA and state staff have limited experience with collaborative approaches to environmental problem-solving; strong media program perspectives and loyalties still dominate many aspects of state-EPA relationships, and there are few incentives for state and federal staff to risk new ways of doing business. PPAs are "in addition to" and many times conflict with delegation agreements, national program guidance, or aspects of state-federal management of environmental programs.

In addition, transaction costs for developing PPAs are believed to be too high, due to a perception that the hours spent planning exceed the hours of actual environmental work. The expected benefits of a reduction of oversight and reporting were not realized. Finally, some states invested considerable resources in developing self-assessments about which they received no EPA feedback. Our partnership strategy will address these and other concerns. The successes we achieve together will enable both states and EPA to advance to a more results-oriented approach to protecting human health and ecosystems.

What We Intend to Accomplish

While the 2002 joint evaluation identified some remaining challenges, states and EPA will work together over the next 5 years to realize the full benefits of Performance Partnerships. EPA's partnership strategy comprises five components. We hope to build a new, collaborative approach to environmental protection that will improve results while reducing overall costs by focusing on these five aspects:

(1) Increase our emphasis on environmental results in state-EPA management of environmental protection programs. We have begun to incorporate more outcome-based Objectives and Sub-objectives in EPA's 2003 *Strategic Plan*, and we will continue to propose new annual performance goals and measures. We will also try to link output measures to longer-term outcomes more clearly and to develop better environmental indicators and the necessary data and monitoring support. We will continue our work with the ECOS-EPA Information Management Workgroup to foster further development of integrated information systems that support results-based management.

(2) Work with our state partners to establish a range of PPAs that advance a results-orientation to priority-setting and planning, tailored to the needs of individual states. EPA will propose a framework for a range of agreements—from a targeted PPA focusing on a limited set of environmental issues, to a comprehensive multi-year, cross-media PPA and PPG. We will analyze and implement ways that EPA and a state can unify all existing agreements under a single definitive agreement that details how they will perform under statutory and delegation requirements. This single definitive agreement will address environmental performance expectations and provide for joint EPA-state performance evaluations that will hold each accountable. The Agency will also work with our state partners through a joint evaluation process to identify ways to improve and advance agreements

and the methods by which they are developed and negotiated.

(3) Improve the state-EPA working relationship and clarify our roles and responsibilities to make more effective use of limited resources. We will identify mandatory activities as early as possible, discuss relative priorities, and work within the agreement format to address new environmental, legal, economic, or political events lying outside state and EPA control that might change work direction. For states with PPAs, we will ensure that only those changes with which appropriate Regional and Assistant Administrators have concurred will occur. We will continue to reduce duplicate activities and, during this era of fiscal resource constraints, increase use of PPGs to address the highest environmental protection priorities. We will also work with interested states to make their normal financial and results information accessible to EPA, precluding Agency requests for special reports. We will strengthen the ways we conduct regular joint evaluations between regions and states to ensure mutual accountability and continuous improvement.

(4) Establish more systematic ways to reflect state priorities in EPA planning and budgeting processes and ensure that states understand and know when to contribute to these processes. We have made progress toward this goal through the consultations that EPA conducted with states, ECOS, and other state organizations during the development of this *Strategic Plan*. EPA regional offices will also be developing Regional Plans that incorporate state and tribal input on priorities, identify priority problems, and describe how states and EPA will address these issues. EPA regions will also solicit state input to EPA's annual planning meeting, budget forum, and establishment of national program performance targets in annual plans and budgets. EPA will also synchronize the timing of its processes for all programs, especially in the development of national program guidance and memoranda of agreement (MOAs), or a successor approach. The Agency will share with states detailed information about the MOA or a successor process, including schedules, key steps, and program documents. Finally, EPA regions will continue to ensure compatibility of commitments in PPAs with national program office strategies.

(5) Promote innovative, cross-media approaches to environmental problem solving. The Agency will encourage and enable state representatives (for example, from the ECOS Cross-Media Committee) to participate on EPA's Innovation Action Council. EPA will continue to encourage use of the Joint EPA/State Agreement to Pursue Regulatory Innovations to provide flexibility needed for state innovation projects. EPA will also attempt to provide funding to encourage and enable state innovation, such as the state innovation grants that were piloted in 2002. Finally, EPA will incorporate state-proposed innovation efforts in the PPA where appropriate, to underscore the importance that EPA and the state accord to innovation..

The belief that states and EPA are equal partners in the national effort to protect human health and the environment is the basis for our partnership strategy. The Nation's environmental laws set certain goals, standards, and approaches for environmental protection to which EPA and its state partners are committed. But environmental issues and problems also vary greatly from region to region, and EPA is committed to adapting to these situations.

There is a burgeoning movement among state governments and the federal government to focus their work on achieving performance results. EPA's support for this movement is evidenced by the Agency's efforts to manage for improved results; improve environmental indicators; promote innovation; and establish an exchange network that will allow EPA, states, and the public to access environmental data. Improving the Agency's working relationship with the states is also part of this performance management effort. Together, these initiatives will help to focus the entire national

environmental protection system on achieving improved results.

Tribal Partnerships

EPA's mission—to protect human health and the environment—applies to all our Nation, including Indian country and areas for Alaska Native Villages. In carrying out our mission, we will build on our strong foundation of working with our tribal partners to ensure that our efforts encompass all U.S. lands, regardless of ownership status or jurisdiction.

Tribes have unique cultural, jurisdiction, and legal issues that present special challenges to the coordination and implementation of environmental management in activities in Indian country. Recognition of the uniqueness of tribal jurisdictional lands was formally made in EPA's 1984 Indian Policy. Vital to that policy is the principle that EPA works with tribes on a government-to-government basis that reaffirms the federal trust responsibility to tribes. Therefore, EPA's work toward a comprehensive plan of application of environmental protection activities in Indian country and for Alaska Native Villages must utilize innovative approaches and coordinated programs that work in partnership with tribes to complement tribal government structures, incorporate tribal priorities, and recognize tribal cultural considerations.

As EPA works with tribes it attempts to do so with the understanding that the work is about more than physical landscapes, rules, regulations, matters of jurisdiction and funding. EPA's work within tribal jurisdictions also recognizes Indian people as a distinct people with distinct ways of life that set them apart from all others. Survival as a people is dependent upon the protection and vitality of tribal homelands. Therefore, protecting that environment and ensuring equitable environmental protection in Indian country and Alaska Native Villages is critical to maintaining the vibrancy of tribal culture.

To help achieve our mission, the Agency will promote greater collaboration with tribes by tailoring environmental programs to protect the natural resources and traditional ways of life and to complement tribal government structures. As we strive to advance consistency and equitable environmental protection in Indian country and for Alaska Native Villages, EPA will promote development of metrics under all of our strategic goals that indicate performance and environmental results for tribes. Where we lack environmental data for Indian country, we will continue our work to reduce data gaps in tribal environmental information.

Information

Accurate, timely, and usable information is the foundation for decisions and actions taken by EPA, states, and others responsible for protecting human health and the environment. Effective information management is vital to the success of EPA's mission, and contributes to the achievement of all Agency strategic goals. EPA develops, collects, analyzes, and provides integrated access to information to promote more knowledgeable and environmentally responsible attitudes, decisions and actions.

EPA's Cross-Cutting Environmental Information Strategy

Enhance environmental results through the improved use of quality environmental information by EPA decision-makers, states, tribes, other partners, and the public to:

- *Promote environmentally-beneficial action;*
- *Improve environmental decisions;*
- *Promote more environmentally responsible attitudes; and*
- *Improve knowledge*

EPA strives to provide the right information, at the right time, in the right format, to the right people. This means making quality environmental and management information available to decision makers for developing environmental policies and priorities. It means making environmental data publicly accessible to support individual and community involvement in decisions that may affect environmental quality. It means building the necessary infrastructure to provide secure information, reliable data, efficient and timely access, and analytical information tools.

New ways of conducting business are required to meet new, more complex information challenges, especially EPA's vital responsibility to work with federal, state, and local partners to ensure homeland security. The Agency's crosscutting information strategy, developed in the framework of the President's Management Agenda, is a three-pronged approach to meeting these challenges. To achieve EPA's mission, over the next 5 years EPA's cross-cutting information strategy will focus on:

Analytical Capacity—providing access to new analytical tools that facilitate data interpretation and enable users to respond to environmental problems, set priorities, make sound decisions, manage for results, and measure performance;

Governance—adopting an Agency-wide approach to managing information, including administrative and programmatic systems, data and investment priorities; and

Excellence in Information Service Delivery—working collaboratively with states, tribes, other federal agencies, and key stakeholders to improve the efficiency and utility of environmental information.

Finally, the need to make environmental information accessible and usable by the American public, including populations that have been historically disenfranchised, is critical. The public's ability to acquire, use, and understand environmental information is increasingly important to solve problems and address challenges.

Decisions regarding Agency information management can potentially affect EPA employees; state, tribal and local partners; and the regulated community. EPA employees rely on the Agency's information management systems, central information services and special information resources to achieve the Agency's mission. EPA has adapted information models that show the clear linkages between information investments and achievement of efficient, effective environmental results. These logical models are part of the business case methodology that EPA uses to evaluate proposed investments in information technology. We will continue to ensure that information technology and data initiatives directly support EPA's mission, and are fully coordinated with efforts of our federal, state, tribal and local agency partners to avoid duplication, reduce burden and increase effectiveness. As part

of its work to meet and exceed federal requirements for information management and services, EPA has been commended for assuring that information investments are made wisely to achieve environmental results.

Analytical Capacity

Desired Outcomes by 2008

Decisions made by EPA, states and tribes, other partners and stakeholders, and the public are strengthened by the improved use of environmental information.

Environmental data are most meaningful when examined from a holistic perspective; that is, when users are able to examine all of the data about a particular situation, location, or source at once.

Integrated analytic capacity is integral to meeting the Agency's five goals. In order to meet the objectives under each goal, EPA, other federal agencies, states, tribes, and other partners require specific information on environmental and human health conditions and analytical tools capable of isolating specific stressors associated with those conditions. These capabilities must be designed to meet the needs of specific objectives—whether assessing global issues such as stratospheric ozone depletion, regional issues such as haze, state-level issues such as watershed protection, or local issues such as ambient air quality protection within a particular metropolitan area.

Improved capacity to integrate and analyze environmental data will support cross-media solutions to complex environmental and human-health problems. Better analytic tools will also help EPA fulfill its homeland security responsibilities by providing a clear picture of the spatial coordinates, materials, and corporate ownership of regulated facilities.

Better analytical capabilities will help managers to assess existing baseline conditions, isolate data gaps, track the implementation of specific solutions, and measure the results achieved. By 2008, EPA will provide analytical tools to support decision-making, results-based management, and the public's right to know.

Over the next 5 years, EPA will:

- Continue to implement the Environmental Indicators Initiative. EPA will establish a set of performance indicators of environmental and human health conditions. Environmental indicators will help in assessments of the effectiveness of environmental programs.

- Implement a suite of customized tools for emergency management. These tools will deliver secure, reliable, and timely data access and communications to on-scene coordinators, emergency response teams, and investigators from field locations.

- Continue to increase the availability of useful health and environmental information. EPA will continue to implement the Toxics Release Inventory (TRI) Program to provide the public with information on releases of toxic chemicals to the environment. The Agency will build on the foundation of existing public access tools such as Envirofacts and Window to My Environment (a geographic portal to community-based environmental information) by providing additional access to information collected by EPA, its partners, and stakeholders.

Governance

Desired Outcome by 2008

Improved Agency operations including the security, collection, and exchange of information by implementing an EPA-wide approach to managing technology and information.

A highly diverse, well-trained workforce able to fully benefit from information technology investments and deliver quality and timely information products and services.

EPA recognizes that successful organizations align technology, people, and processes with goals. Information governance is the Agency's strategy to ensure efficient, coordinated management of information assets across all EPA programs. An Agency-wide approach to information will allow EPA to make key information, technology, and funding investments that improve the efficiency and effectiveness of services and operations.

Enhanced information governance will help the Agency identify and manage the "informational infrastructure" or common information elements used by more than one program area. Shared management of the informational infrastructure will better position the Agency to develop integrated, multi-media strategies, improve the efficiencies of information collection and exchange, and reduce the administrative burdens associated with the Nation's environmental protection programs for states, tribes, and the regulated community. By 2008, EPA will fully adopt and implement an Agency-wide approach to make and implement information management decisions.

Over the next 5 years, EPA will:

- Continue to develop its Enterprise Architecture. Enterprise architecture involves identifying the business processes that support Agency goals, the data needed to for environmental results, and the technology that most efficiently secures and delivers the data. Enterprise architecture drives investment decisions and promotes wise investments in information technology.

- Continue to focus on partnering. EPA will continue to strengthen emerging partnerships, identify collaborative goals, promote integrated planning, and foster interagency coordination with other federal agencies, States and Tribes. The foundation for meeting these goals is access to the collective data resources of all partners.

- Improve existing governance processes. EPA will continue to pursue an investment strategy to support a strong Agency information architecture program and investment management process as outlined by the Federal Chief Information Officer Council and as required by the Clinger-Cohen Act. The architecture and investment review processes will govern funding for individual systems development and modernization.

Desired Outcome by 2008

Enhanced information integrity, analysis, and access strengthened by software tools and the collection of quality and appropriate data.

Excellence in Information Service Delivery

Information technology is transforming

the way EPA conducts the business of environmental protection. But EPA faces information management challenges similar to those faced by many other private and public organizations. The Agency must continually adapt to emerging technologies such as electronic-commerce and web services that enable organizations to become more productive, effective, and proactive in service delivery. Three major themes of change in information service delivery are streamlining management processes, linking data partners, and improving information access.

EPA, like other public and private organizations, is exploiting information technology to streamline internal management processes. New administrative systems for financial, personnel, and program management will integrate data, eliminating database fragmentation and limited information access. Groupware applications are enhancing the traditional Agency workgroup process by improving information flow, facilitating meeting scheduling, and encouraging more frequent team member involvement. In other organizational settings, changes such as these have been shown to deliver measurable improvements in the quality and efficiency of administrative work processes.

Second, networks will link EPA to federal, state, tribal and other implementation partners as the means of exchanging policy, research, management and performance information between Agency organizations and State environmental programs throughout the country. In the U.S. economy, distributed network technology is fast eliminating time and distance as obstacles to business collaboration. Today, vast webs of suppliers are able to contribute to work products in a global marketplace according to their specialized expertise. The result: greater innovation and resource productivity.

Finally, explosive growth in data processing and storage capacity has opened up new opportunities for accessing data from multiple sources. Fine resolution data from local monitoring organizations can be assembled into geographic information systems providing holistic environmental pictures on geographic scales both large and small. Mountains of data collected using advanced monitoring technologies in space, the air and on the ground can be placed at the public's fingertips in usable formats. Integrated public information has been shown to deliver bottom-line improvements in environmental programs, by closing the behavioral gap between environmental policy and private actions.

Improved information service delivery is key to the implementation of many of the objectives detailed under the Agency's five strategic goals. The utility of environmental information, from ambient monitoring data to compliance assistance material, will depend largely upon the Agency's ability to ensure that the right information is provided to the right user at the right time. By 2008, EPA will increase the operational efficiency of all Agency business processes through the use of information technology.

Over the next 5 years, EPA will:

- Solicit customer feedback. This feedback will be used to systematically improve information usability, clarity, accuracy, reliability, and scientific soundness. Other efforts to improve information will include the development and implementation of necessary data standards and associated registries to improve the consistency, quality, and comparability of data managed in national environmental systems. EPA will require that data quality is known and appropriate for intended uses. Usability testing and customer satisfaction baselines will assure that the information the Agency provides is meeting the needs of its customers.

- Streamline information collection. This will help regulated entities to meet regulatory requirements while eventually easing burdens placed on states and the Agency to collect information. The Agency will continue to assess the information reporting burdens placed on its partners and on the regulated community, and align information collection requirements with specific needs. EPA will improve the timeliness and completeness of requests for information by implementing an Agency-wide electronic records and document management system. The Agency plans to develop and acquire the necessary software and hardware to begin phased implementation of the system throughout the Agency.

- Continue to develop the Exchange Network. The Exchange Network is a comprehensive, integrated information exchange program designed to strengthen the partnership between, and facilitate information sharing among, EPA, states, other federal agencies, tribes, localities, and the regulated community. The Exchange Network will provide a wide range of shared environmental information and improve environmental decision making through increased availability of quality data, enhanced security of sensitive data, avoidance of data redundancy and conflict, and reduced burden on those who provide and those who access information. It uses an internet-based, multi-media approach to environmental information exchange that is standards-based, highly connected, flexible, and secure. Additionally, through an information grant program begun in 2002, states and tribes will be better positioned to participate in the Exchange Network.

  The Central Data Exchange (CDX) is the electronic portal of the Exchange Network through which information is securely received, translated and forwarded to EPA's data systems. In 2004, the CDX infrastructure will service 46 states, and over 25,000 facilities, companies, and laboratories will use it to provide data to EPA electronically. By widely implementing an electronic reporting infrastructure, CDX will reduce reliance on less efficient paper-based processes, resulting in improved data quality, reduced reporting burden, and the creation of new opportunities for simplifying the reporting process. Electronic reporting through CDX will be possible for all of the national environmental systems. CDX will serve as the Agency's node on the Exchange Network, providing data exchange services for states and other EPA partners. The Agency will make strategic investments in the information infrastructure that support our 10 regional offices

- Continue to focus on data quality. EPA has a key role in working with data partners to develop and promote consistent, complete, current, and reliable data to support full and effective information sharing, environmental monitoring, and enforcement. EPA will continue to develop Agency-wide policies and procedures for planning, identifying data needs, documenting, implementing, and assessing data collection and use in Agency decisions. EPA will continue to work with data partners to develop and implement data standards. The Agency will also continue to implement its Information Quality Guidelines, to help ensure that information EPA provides to the public is of the highest quality.

Context of Federal Innovation in Information Management

All EPA's emerging information capabilities will continue to support and further the President's Management Agenda Electronic Government (e-Gov) Strategy for improving service to citizens, business, and others while increasing efficiencies. EPA will continue to collaborate with other federal agencies, states, tribes, and local partners to expand Internet access, improve the quality of services, and drive down the cost of basic government functions. The approach of the e-Gov Strategy is to

simplify processes and unify operations to better serve citizens' needs. EPA will continue to implement this vision and eliminate redundancies and overlaps in such functions as small business compliance, payroll and other resource functions, and geospatial information. Overall, EPA is participating as a partner in 14 designated e-Gov projects and is the lead agency for the Online Rulemaking Initiative to make the rulemaking process more transparent to citizens and businesses.

By implementing this information strategy, EPA will keep pace with the rapid advances in information technology and meet the growing demand for reliable, quality environmental information.

Innovation

EPA's Innovation Strategy

In 2002, EPA released a strategy to strengthen environmental protection through the power and promise of innovation. *Innovating for Better Environmental Results: A Strategy To Guide the Next Generation of Environmental Protection* is designed to drive innovation in environmental programs.

EPA and many other environmental policy leaders see a critical need for environmental innovation. The U.S. environmental protection system is widely recognized as one of the strongest in the world. For more than 30 years, this system has succeeded in cleaning up some of the most visible and egregious forms of pollution and provided Americans with strong environmental and public health protection. But that legacy of progress is challenged by an increasingly complex set of environmental problems, like global climate change and polluted runoff, that will require a broader set of tools than we have relied upon in the past. At the same time, EPA and other agencies are experiencing the reality of tight budgets and pressure to be more accountable for results. Other factors spurring environmental innovation include the availability of powerful new information technologies that can advance environmental knowledge and public and private interests in making environmental management a value-added endeavor. Yet another factor is the need to address sustainability, environmental justice, and other issues with interwoven social, economic, and environmental dimensions. Together, such challenges make environmental innovation an absolute imperative.

EPA's Innovation Strategy responds to this need and provides a vision for what our environmental protection system should be. That vision, one that is now widely shared in the environmental policy community, is for a system that puts more emphasis on results; in which the focus is on environmental responsibility, not just pollution control; and where multimedia approaches address problems in a comprehensive rather than piecemeal fashion. The system envisioned would rely more on incentives to motivate better environmental performance and on partnerships that help to leverage ideas and resources for greater environmental gain.

Developed in consultation with states, the Innovation Strategy consists of four inter-connected elements that will enable progress towards this long-term vision and, in the shorter term, progress under EPA's *Strategic Plan*. The first element is designed to strengthen our partnership with states and tribes. With shared responsibilities for environmental programs, states and tribes are EPA's most important partners, and they share our interest in innovations that can improve results. The Innovation Strategy lays out a set of actions designed to enable state and tribal innovation. These include finding

ways to improve the National Environmental Performance Partnership System and the Joint State/EPA Agreement to Pursue Regulatory Innovations, two policy tools that provide a means for jointly advancing innovation initiatives. Another priority is providing states with opportunities for earlier, more meaningful input in EPA's planning and budgeting processes, where decisions about resources for innovation are made.

The second element focuses on using innovation to solve a set of priority environmental problems—greenhouse gases, smog, degrading water quality, and deteriorating water infrastructure. While there is a need for innovation in solving many environmental problems, these are especially important because they are persistent, widespread problems that are not being adequately addressed with the tools and approaches that exist today. From voluntary agreements with key industry sectors, to market-based trading programs that create an economic incentive for environmental improvement, to new information tools that support decision-making, the Innovation Strategy calls for a suite of creative approaches for making progress on these priority problems.

The problems just described highlight the importance of continuously developing new tools and approaches that can expand and enhance environmental problem-solving. The third element of the Innovation Strategy focuses EPA on the continued development of tools that have already proven effective on a limited scale and that have applicability across many environmental programs. They include information tools that can improve our understanding of problems and solutions, Environmental Management Systems (EMSs) that can foster a more comprehensive approach to environmental protection, incentives that can motivate better environmental performance, environmental technologies that can improve results and lower costs, and performance measures that show how well innovations are working.

Finally, the Innovation Strategy focuses on what may be the most important element of all—creating a culture and set of organizational systems that foster innovation throughout EPA. The goal is to have each individual within the EPA work force view his or her job more broadly, as an environmental problem-solver, a partner, a facilitator, and a leader, as well as a program implementor. Communicating results from innovations, rewarding the innovators, and ensuring that successful approaches are considered for broader replication are just some of the ways we will work to realize our innovation potential.

With its comprehensive focus and detailed plan for implementation, EPA's Innovation Strategy identifies a number of actions that will drive innovation throughout the Agency. The next section highlights innovative approaches that will be used to ensure progress toward each of our national environmental goals.

Innovative Approaches For Achieving National Goals

Clean Air

From indoor environments to global climate change, EPA faces the challenge of developing air strategies that are workable on very different scales and for very different circumstances. We will meet this challenge by innovating in air programs, policies and regulations. For example, our strategy for reducing smog calls for national leadership, creating new inherently innovative programs such as the Clear Skies Initiative, a new market-based cap-and-and trade program modeled after the Acid Rain trading program. We will continue to develop new regulations where needed, but those regulations will be crafted in innovative ways to improve results, ease implementation, and decrease costs. Outside the

regulatory arena we will work to reduce smog and greenhouse gas emissions by developing new cleaner technologies and promoting the use of those developed by others. We are also creating a range of partnership and information programs to foster improvements across the nation.

But national actions can not do it alone. That is why we will continue to work at the local level, providing information and tools that empower people to make a difference in their communities. We will look for ways to meet the needs of different communities and to provide them with the support and tools they need to achieve cleaner, healthier air.

The Innovation Strategy also calls for management actions that will lead to more efficient and effective regulatory approaches to clean air. One is to evaluate pilot projects that can show whether an innovation has value. For example, in the mid-1990s, EPA launched a series of innovative air permitting projects designed to streamline the regulatory process and foster pollution prevention. The results show that flexible air permits can help companies achieve equal or greater environmental protection, improve competitiveness, and encourage pollution prevention, while still retaining practicable enforceable capabilities.

Over the years we have developed a number of innovative programs and new tools to achieve environmental improvements. Now the key is to learn from these innovative approaches and use our experience to create additional options for cleaning the air. In this way, we can tailor clean air strategies, using new and traditional tools, to ensure that we are using the approach that will achieve the best possible results.

Water

In the national water program, the focus is on watersheds, those naturally defined areas that encompass and impact our rivers, streams, and lakes. By looking at the watershed as a whole, rather than as a set of unrelated components, watershed management offers a more advanced and effective approach for improving water quality. To support this approach, the Innovation Strategy calls for EPA to launch a national Watershed Protection Initiative that will provide grants to support protection and restoration activities in up to 20 priority watersheds. It also commits EPA to issuing a national policy on water quality trading that will encourage use of this cost-effective approach for meeting water quality goals.

Another priority for the national water program, and one that clearly can benefit from solutions, is water infrastructure. A 2002 EPA study revealed a critical funding gap for meeting U.S. wastewater and drinking water infrastructure needs. Recognizing this need, the Innovation Strategy called for a national forum to discuss innovative management mechanisms to reduce the life cycle costs of infrastructure and more flexible financial mechanisms to fund improvements. EPA held that forum in January 2003, and many of the ideas that emerged are reflected in this *Strategic Plan*.

Land

The Innovation Strategy's emphasis on testing, evaluating, and implementing innovative approaches to environmental problems; fostering a more innovation-friendly culture within EPA; and working through partnerships and stakeholder collaboration will promote better waste management and the clean up of contaminated waste sites. In particular, innovative tools and approaches will be used for land revitalization; consistency and enhanced effectiveness in site cleanups; and waste minimization, recycling, and energy recovery of hazardous and non-hazardous wastes.

Building upon the success of the Brownfields Program, EPA will pilot projects that integrate land reuse into all land clean-up processes, explore the use of innovative public and private property reuse and stewardship mechanisms, and actively seek out opportunities for policy reforms. We will do so by working with partners and stakeholders to enhance coordination, planning, and communication across the full range of federal, state, tribal, and local cleanup programs. These efforts will improve the pace, efficiency and effectiveness of site cleanups, as well as more fully integrate land reuse into cleanup programs.

Recognizing that many changes have taken place since the Resource Conservation and Recovery Act was originally passed, EPA is launching a national Resource Conservation Challenge that is designed to find flexible, yet more protective, ways to conserve our natural resources through waste reduction and energy recovery. This new program will take a comprehensive, integrated approach that includes traditional waste management programs and lesser recognized avenues, inside and outside of EPA, for promoting waste minimization and natural resource conservation. This will involve forming diverse partnerships to test innovative approaches to waste reduction and to stimulate development of new environmental management infrastructure and technologies.

Healthy Communities and Ecosystems

The Innovation Strategy recognizes the value of community-based approaches that integrate environmental management with human needs, consider the long-term ecosystem health, and highlight the positive correlations between environmental well-being and economic prosperity. Many actions planned under the Innovation Strategy have this kind of comprehensive, community-based focus. For example, the national air program is supporting the development of a regional strategy to comprehensively address multiple air quality problems, as well as economic growth, land use patterns, transportation, and energy issues, in a growing urban area along the North Carolina-South Carolina border. Likewise, the national water program's watershed strategy will enable a more comprehensive, stakeholder-driven approach to achieving water quality goals.

The Innovation Strategy also calls for environmental protection tools and approaches that can be used to protect people, communities, and ecosystems. For example, improving the use and deployment of information resources and technology means we will have more powerful tools to make environmental management decisions. It will also enable us to give citizens information they can use in their own lives, and if they choose, to become more involved in environmental decision-making. The emphasis on developing results-based performance goals and measures will have similar consequences, creating information that agencies can use to manage programs and provide public accountability.

Finally, the plans for strengthening our partnership with states and tribes are designed to improve the environmental and public health effectiveness of our individual levels of government. Engaging states earlier in national planning and budgeting processes, facilitating state innovations, and reaching out to build working relationships with agriculture, transportation, and other agencies with environmental interests are just some of the means through which we will enhance protection for communities and ecosystems.

Compliance and Environmental Stewardship

The vision described in the Innovation Strategy would raise the bar for environmental performance by creating an environmental protection system that encourages greater environmental

stewardship across all parts of society. Getting there means finding ways to bring together compliance, pollution prevention, and environmental leadership initiatives in a way that facilitates environmental management and maximizes environmental results. It also means meeting the various needs that exist along the environmental performance spectrum, from the leaders that are pursuing advanced environmental improvements to enterprises such as small businesses that require assistance in meeting regulatory responsibilities.

The Innovation Strategy calls for more support and encouragement for environmental leaders by expanding the National Environmental Performance Track. This unique program offers rewards and recognition for strong environmental performance. The Innovation Strategy focuses on making membership even more valuable by offering additional regulatory incentives and a higher level of membership for the very top performers. While the program clearly benefits members, its greatest value is in creating role models and mentors that other facilities can learn from as they pursue their own environmental improvements.

The Innovation Strategy also recognizes the value of smart and strategic compliance assurance in helping companies meet their environmental responsibilities. To this end, it focuses EPA on using the full range of compliance assurance tools and combining them in ways that improve environmental management by regulated entities, maximize compliance, and address the needs of environmental justice communities. These integrated approaches include voluntary compliance incentives, such as the Audit, Small Business, and Small Communities Policies to encourage self-auditing, reporting and correction; the use of EMSs in enforcement settlements to address serious environmental management problems; and creative supplemental environmental projects that return significant, tangible benefits to communities harmed by non-compliance. Yet another is the award-winning environmental results program. Pioneered by Massachusetts, this program merits expansion because it improves the performance of small businesses, results in savings for those businesses, and allows EPA and states to focus resources on priority environmental problems.

Providing smart, strategic compliance assurance also means providing additional tools to help facilities understand environmental laws and regulations. EPA partners with compliance assistance providers to provide easy access to compliance information through the National Compliance Assistance Clearinghouse and "virtual" compliance assistance centers that support specific industry sectors and national environmental program priorities. These innovative resources harness the power of the internet to meet small business needs. The Innovation Strategy will direct more attention to small business needs, starting with a national small business environmental summit and development of a comprehensive small business assistance strategy.

Managing Innovation at EPA

The complexity of today's environmental challenges, coupled with the need to achieve environmental results more cost-effectively, make environmental innovation an imperative. But innovation brings its own set of challenges. As EPA pursues new approaches for improving environmental results, we are faced with the difficulty of crafting multimedia solutions within a single media-based organization, the complexity of sharing responsibilities across several layers of government, and the need to maintain baseline environmental protections while still creating room for experimentation.

EPA's Innovation Action Council provides experienced leadership for addressing these and other challenges. This group of senior managers provides overall direction for innovation, demonstrated

most recently through development of the Innovation Strategy. The Innovation Action Council also helps resolve policy issues that invariably arise during the course of exploring new approaches.

In addition, EPA has formed a National Center for Environmental Innovation to advance innovation in environmental programs. Established in 2003, this organization combines staff that have led some of EPA's most innovative initiatives, and it has several unique roles. First and foremost, the Center is a focal point for strategic thinking on innovative approaches to environmental management and provides a point of contact for organizations that share EPA's environmental innovation interests. It acts as a partner with organizations that want to test and evaluate innovative approaches and as a proponent for replicating innovations that prove successful. The Center also stays at the forefront of scientific, economic, and other social trends in order to bring the value of new developments to EPA's strategic thinking, planning, and management. Together, the National Center for Environmental Innovation and the Innovation Action Council provide the leadership needed to guide innovation and realize its full value for improving environmental results.

Human Capital

Protecting human health and the environment requires a highly skilled and motivated workforce that seeks creative solutions to environmental problems and is committed to achieving excellence. EPA's Human Capital Strategy will ensure that the Agency's workforce is high performing, citizen-centered, and aligned with EPA's strategic goals and corresponding objectives for air, water, land, healthy communities and ecosystems, and compliance and environmental stewardship.

To implement its Human Capital Strategy, EPA must integrate workforce planning, employee development, and targeted recruitment with established Agency processes for strategic planning and resource management. This comprehensive and systematic approach combines strong national leadership with effective planning and implementation of human capital programs across the Agency. The Strategy addresses both the Agency's current and future workforce needs to accomplish its goals and objectives.

Built upon the Office of Personnel Management (OPM) six pillars of effective human capital management, EPA's Strategy for Human Capital establishes objectives to ensure that the Agency:

- Aligns its workforce to accomplish strategic goals and objectives to protect human health and the environment through effective integration of Agency-wide planning and management processes;
- Conducts workforce planning and deployment at the national, regional, and program levels and deploys employees or assigns work based on mission-critical needs;
- Maintains continuity of leadership and employee skills and competencies through strong knowledge management, employee development programs, and succession planning;
- Encourages a results-oriented workplace and culture by emphasizing performance management;
- Identifies, hires, and retains talented individuals, using innovative and progressive tools for recruitment and retention;
- Evaluates its human capital programs to ensure they are data-driven, cost-effective, and held

accountable for results by developing and linking program performance to organizational goals.

Strategic Alignment with Mission

The first objective of the Human Capital Strategy is to align EPA's workforce to accomplish strategic goals and objectives to protect human health and the environment. The Agency accomplish this alignment in two ways: (1) by addressing human capital management issues under each of the Agency's five strategic goals and (2) by explicitly linking human capital activities with annual Agency-wide processes for strategic planning and budgeting. By 2004, EPA will make planning, reporting, and accountability for effective human capital management an essential component of its Annual Performance Plan and Budget. Linking dollars, people, and skills together will enable program managers across the Agency to develop a more complete assessment of the resources required to meet annual performance goals and strategic goals and objectives.

EPA's Human Resources Council (HRC), composed of headquarters and regional senior leaders, is expected to actively communicate the Agency's vision for human capital to employees at every level and to play an essential role in cascading human capital planning activities to all levels of the Agency. In addition, EPA's Senior Policy Council, comprising Assistant Administrators and Regional Administrators and established to address cross-cutting Agency issues, is expected to communicate human capital roles and responsibilities and inspire employee commitment to the President's and the Administrator's vision. Senior Policy Council members will also ensure that resources and tools for sharing knowledge are available to their organizations and across the Agency and foster a culture of continuous learning. Both Councils will support Agency efforts to develop performance metrics for evaluating the effectiveness of EPA's human capital programs.

As EPA fully implements its Strategy for Human Capital, it will continue to benchmark best practices of other federal agencies and evaluate whether EPA should implement similar strategies or processes. The Agency will review and strengthen its Strategy for Human Capital as a result of ongoing work with OPM, the Office of Management and Budget (OMB), the General Accounting Office (GAO), and inter-agency councils, and it will consider lessons learned to improve its human capital strategies.

Workforce Planning and Deployment

Workforce planning is an integral, strategic, and tactical approach for addressing many of EPA's human capital issues. EPA has identified 11 key business lines—each with a unique set of skills and competencies—to help the Agency align mission-critical work with the skills of its workforce. To facilitate this alignment, EPA developed a National Strategic Workforce Planning methodology and online support system and is in the midst of phased implementation. The Agency's workforce planning system will enable line managers to make decisions in the deployment of employees with mission-critical skills and competencies both programmatically and geographically to fulfill EPA's mission. By 2005, EPA's workforce planning system, in conjunction with established Agency systems for planning and budgeting, will support analysis and decision making for effective management of human capital.

In making effective workforce deployment decisions, EPA recognizes the need to look beyond numbers of employees and their respective skills. The Agency continuously examines environmental objectives, changing priorities, and emerging technologies. EPA's competitive sourcing efforts

complement the Human Capital Strategy by providing an opportunity to analyze the Agency's activities and increase the efficiency and effectiveness of Agency operations. EPA is examining those activities with potential for efficiency gains either through internal improvements or competition/direct conversion.

To leverage the skills and talents of its workforce, the Agency will evaluate human capital innovations for possible national deployment. Examples include:

- *Assignments, not Positions* Program. EPA Region 10 offers voluntary rotations every 3 years to encourage employees to swap jobs and learn about technical programs outside of their immediate expertise. Since 1996, approximately 70 employees have participated in each of the three *Assignments, not Positions* exercises, and more than 100 people have moved to new assignments, bringing new insights and fresh points of view to their new organizations.

- *The Senior Executive Service (SES) Mobility Program*: To optimize the talents and development of its senior executives, in 2002 EPA moved more than 60 executives into new positions across the Agency through the SES Mobility Program. The Mobility Program concept may be extended to other EPA levels of management to strengthen leadership skills and provide cross-Agency exposure. Such flexibility supports continued development of EPA managers by challenging them with new learning experiences and broadening their view of the Agency. If implemented, these development opportunities would strengthen EPA's succession planning and management efforts as well.

EPA is using advances in information technology to improve accessability of personnel data for managers and employees through its automated human resources information system (HR Pro). Improved access to personnel data will help employees manage their careers and Agency leaders make critical decisions as they manage their organizations' human capital resources.

- Employee Profiles will provide employees with access to their official personnel record to update personal information such as emergency contacts, home address/phone, handicap/special needs designations, and other business-process-related information.

- E-Development provides web-based access for employees and managers to update/review training information, review/approve training enrollment, and document newly acquired skills.

- The Manager's Desktop gives supervisors and managers access to workforce information to facilitate organizational decision making. It also provides the connection for managers to initiate and track personnel action change requests electronically.

EPA is also supporting the President's government-wide E-Gov Internal Efficiencies and Effectiveness (IEE) initiatives to bring commercial best practices to key government operations. EPA is an active participant in a number of government-wide human-resources-related E-Gov activities including the following projects:

- *E-Payroll* consolidates systems at more than 14 processing centers across government and eliminates duplication in purchases of enterprise resource planning software;

- *Enterprise Human Resources Integration* electronically integrates personnel records across government and reduces delays involved in security clearance processing; and

- *Recruitment One Stop* modifies USA Jobs to create an automated resource for federal government information and career opportunities. It allows for automated resume and assessment tools with the ability to route resumes, assess candidates, and streamline the federal hiring process, and it provides an up-to-the-minute application status for job seekers.

Leadership and Knowledge Management Strategies

The anticipated loss of institutional knowledge as managers and employees retire clearly highlights the need for effective leadership and knowledge management systems. To address this need, EPA is refining and enhancing three core strategies: growing leaders throughout the organization, promoting continuous learning, and enabling knowledge transfer.

Through EPA's Workforce Development Strategy, the Agency grows leaders by offering developmental programs centered around EPA's core competencies and the SES Executive Core Qualifications. Using a combination of classroom training, mentoring, coaching, and rotational assignments, EPA will continue to build its leadership capacity.

With an increasing number of EPA's current senior executives eligible for retirement, EPA's SES Candidate Development Program (CDP) will help to mitigate the loss of leadership, institutional knowledge, and expertise. By 2004 EPA will graduate over 50 highly qualified SES candidates to replace the retiring SES corps. EPA will continue to use and strengthen the SES CDP to ensure continuity of leadership.

EPA is establishing a continuous learning culture that enables employees and managers to adapt to the rapidly changing political, social, and economic environment. A key component of this learning culture is feedback systems. EPA's performance management system provides regular performance feedback to employees and helps them understand how their work aligns with the Agency's mission. To help Agency managers assess and improve their performance, EPA is implementing a 360 degree feedback pilot program. Through this program, EPA employees and peers are able to provide managers with feedback to on their performance. The results of the pilot will guide Agency-wide implementation over the next several years.

Evaluations of EPA's human capital programs will provide feedback at the organizational level. In 2003, the Agency is evaluating the EPA Intern Program to assess its effectiveness in recruiting and growing a diverse group of future Agency leaders. In 2004, EPA will begin evaluations of the Agency's other workforce development programs. The results of these evaluations will be used to improve and refine our leadership development and knowledge management activities.

Supported by the workforce planning system, EPA is examining ways to access and link information on EPA expertise in selected skills and competencies. Building this capacity will enable the Agency to align capabilities with mission-critical projects and utilize in-house resources and expertise.

Performance Culture

To carry out its mission and mandates, EPA is building a results-oriented workforce and culture. The Agency is implementing three core strategies: enhancing performance management, fostering workplace diversity, and improving employee/labor relations management. These strategies

help Agency employees and managers understand their roles and responsibilities in achieving EPA's mission and improving methods for evaluating and improving performance.

In 1998, EPA redesigned its performance management system, PERFORMS (Performance Planning, Employee Rating, Feedback, Opportunity, and Recognition Management System), to more clearly, simply, and easily communicate performance expectations to managers and employees. EPA's performance management system reduces administrative burden and minimizes paperwork for managers in an environment of broader spans of control, while providing for more frequent, meaningful, two-way communication between supervisors and employees. An essential aspect of PERFORMS is separating cash awards from ratings of record, so that feedback and rewards occur not just at appraisal time but throughout the year to highlight and reinforce excellence in a timely manner.

There are a variety of awards, both monetary and non-monetary, available to supervisors and managers for use as tools to motivate or recognize individual employees, teams, or organizations for high performance. Although the Agency has pay and performance systems in place to provide timely feedback and pay for increased contributions, EPA is reviewing these systems to ensure that, in fact, skilled individuals are attracted, encouraged, and rewarded for their high performance. EPA is evaluating its performance management system to confirm that the system improves communication between employees and managers and sets appropriate performance expectations. The Agency is also benchmarking other federal and private sector performance management systems for application at EPA.

The EPA National Diversity Action Plan (DAP) Initiative represents the Agency's comprehensive strategy to ensure that all employees are afforded equitable treatment. EPA is educating employees about diversity issues; promoting a dialogue within every office to address and work through these concerns; recruiting and maintaining a diverse workforce; and developing and implementing concrete solutions to EPA's diversity issues. EPA will continue to examine ways to expand diversity recruitment to identify candidates for mission-critical positions.

EPA and its National Partnership Council are working to foster collaborative relationships among Agency managers, unions, and employees to improve working conditions, career development, and morale of employees. EPA has also established the Workplace Solutions Staff to provide a one-stop source of employee services for workplace conflicts, including informal mediation, conflict resolution, Alternative Dispute Resolution awareness training, outreach, and consultation services for Headquarters employees. The Staff focuses on the prevention and resolution of workplace disputes and coaches employees to deal with workplace conflicts more effectively in order to resolve disputes prior to the filing of formal grievances or complaints. To improve Labor Management accountability, HR Pro provides modules to manage labor-employee relations by creating a corporate database for tracking labor/management agreements, decisions, and disputes.

Recruiting and Retaining Talent

In light of changing Agency priorities, growing numbers of senior managers and employees eligible for retirement, and the increasingly competitive market for individuals with desirable or unique skills, EPA's Human Capital Strategy places strong emphasis on recruiting and retaining creative and talented people. EPA is using its workforce planning system to identify gaps in mission-critical skills, knowledge, and competencies in conjunction with employing a variety of human resource tools to recruit and retain a diverse and highly skilled workforce.

EPA is maximizing its use of special hiring authorities, incentives, and internship and fellowship programs to attract and retain a talented workforce. For example, to recruit and retain talented researchers that EPA may not otherwise attract, the Agency is examining the use of a focused pilot program (not subject to Title V) to hire up to five researchers a year with a salary cap of $200,000. In addition, EPA is reviewing innovative pay strategies being utilized across government. This review will focus on pay structures, flexibility, and opportunities relative to the Agency's workforce needs, job market conditions, and program requirements.

The Agency is exploring flexible organization structures, collaborative work arrangements, multi-skilled teams, and options to promote a family-friendly, quality work environment. EPA is also interested in reviewing the proposed civil service retirement system computations for part-time service that eliminate disincentives for employees nearing the end of their careers who would like to phase into retirement by working part-time schedules. This would allow EPA to keep senior staff in hard-to-fill positions as part of a succession planning/management effort.

In addition, EPA is reviewing the human resource tools (voluntary separation incentives and early retirement authority) of the Homeland Security Act for possible Agency implementation. These tools provide more flexibility than do the current regulations and may aid in reshaping the workforce when the skill mix in an organization is no longer optimal for carrying out the Agency's mission.

Accountability

In order to manage EPA's Human Capital efforts effectively, the Agency has established and continues to improve its Human Resources Management (HRM) Accountability Program. EPA is developing a template to ensure that all Agency employees, from the Administrator to EPA's rank and file, understand their human capital roles and responsibilities.

EPA's senior political and career leaders are taking an active role in communicating EPA's human capital vision to all levels of the organization. The Agency's HRC advises the Administrator and Deputy Administrator on human resources issues, maintains a sustained commitment to human resources within EPA, and oversees implementation of Agency-wide human capital initiatives and policies. The Senior Policy Council advises the Administrator and Deputy Administrator on cross-cutting Agency issues and helps to communicate the impact of these issues on the Agency.

EPA's Human Resource Program Managers, in headquarters and each regional office, ensure that employees are recruited and hired to meet the needs of the Agency and in accordance with merit-based principles and other civil service personnel requirements. EPA's new HRM Accountability Program ensures effective merit-based decision making by collecting substantive data that serve as a primary diagnostic tool and provide information on performance measurement indicators. Annual on-site reviews of human resources offices and delegated examining units will:

- Certify knowledge of, and compliance with, Merit System Principles;
- Identify the contribution that human resources management makes to organizational effectiveness;
- Determine whether human resources management is accomplishing its objectives;
- Establish a database that can assist managers in making human resources decisions; and

- Identify strengths and weaknesses of human resources programs and processes.

As a part of EPA's future Human Capital Planning Process, the Agency is initiating development of Annual Human Capital Plans in concert with the Agency-wide process for developing Annual Performance Plans. Data-based planning and analysis required for Annual Plans will rely heavily on the near-term completion of EPA's workforce planning and allocation model to help programs identify the competencies needed to meet EPA's strategic and organizational goals. Annual Human Capital Plans will integrate EPA's strategic goals and objectives with strategies for deploying both resources and workforce development tools needed to achieve them. EPA is developing results-oriented performance goals and measures and a performance tracking mechanism to link the effectiveness of the Human Capital Program with the Agency's environmental mission. Performance goals and measures help EPA track success toward strategic objectives, guide implementation of the Agency's Strategy for Human Capital, and evaluate EPA's framework for aligning human capital with the Agency's *Strategic Plan*.

The Road Ahead

Investing in Our People, EPA's Human Capital Strategy for 2001 through 2003 (developed in 2000) laid the foundation for strengthening the Agency's human capital practices. EPA's current effort to integrate human capital into its strategic planning process serves as a blueprint for the work that remains to be done. The Agency recognizes that implementing its Human Capital Strategy will not happen overnight. It will take time, persistence, and dedicated resources. This integration effort will lead to human capital planning at all levels of the organization. Responsibility for ensuring sound human capital investment and management will be shared by all national and regional offices, managers and supervisors, and staff across the Agency.

Science

Today, scientific knowledge and technical information are more important than ever as we seek to understand, and successfully address, the increasingly complex environmental problems facing our Nation (NRC, 2000). EPA has identified sound science and credible data among the guiding principles we will follow to fulfill our mission to protect human health and environmental quality. EPA relies on science, technology, and scientifically defensible data and models to evaluate risk, develop and defend protective standards, anticipate future health and environmental threats, and identify their solutions.

To conduct science of the highest quality and relevance, we promote collaborative partnerships and expert peer review. Our approach to addressing science issues is centered around generating and using scientific information based on science priorities ("doing the right science") and sound science practices ("doing the science right.") We do this through partnerships with states, tribes, and other federal and international institutions and by producing scientific information of the highest quality. The Administrator has named a Science Advisor to work across the Agency to ensure that the highest quality science is better integrated into the Agency's programs, policies, and decisions.

> "Sound science is the foundation of EPA's work. We rely upon science and technology to help us determine which environmental problems pose important risks to our natural environment, human health, and our quality of life."
> Governor Christine Todd Whitman
> EPA Science Forum (May 2002)

Generating and Using Scientific Information

EPA's organizing principle for generating and using scientific information is the risk assessment/risk management paradigm (Figure 1). Risk assessment is the process that scientists use to understand and evaluate the relative size (magnitude) and likelihood (probability) of risk posed to human health and ecosystems by environmental stressors, such as air pollution or chemicals in drinking water. Risk assessments play an important role in Agency decisions and, as appropriate, they are joined with other scientific information, such as economic data and engineering studies, as part of a complete scientific analysis to inform decisions. Risk management involves determining whether and how risks should be reduced. Scientific analysis taken together with non-scientific factors such as public values, social factors, legal requirements, and statutory mandates inform Agency decisions and guide our actions.

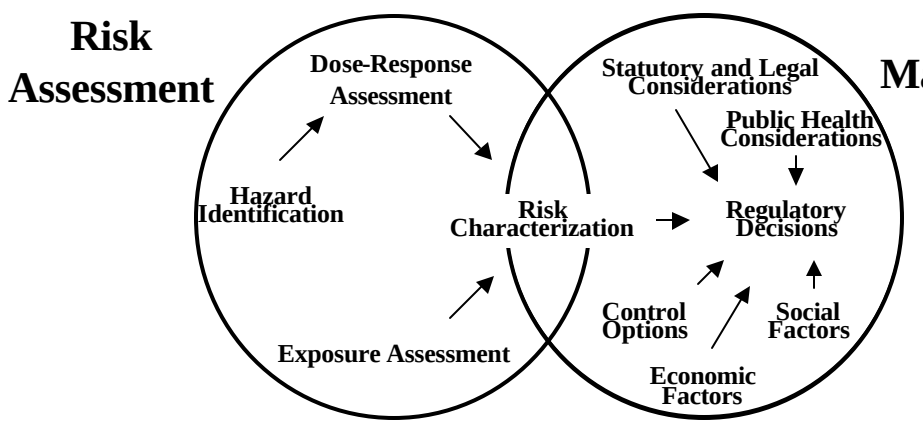

Figure 1

The scientific data used in risk assessments are generated in research facilities, collected in the field, and compiled from the body of scientific literature. EPA creates and gathers scientific information through our laboratories, centers, program and regional offices and from external partners such as states, tribes, other federal agencies, the academic community, and the regulated community. Making environmental decisions built on sound science includes ensuring that scientific findings are properly described (characterized). To characterize scientific findings properly, the knowledge, assumptions, and uncertainties regarding the science must be clearly stated.

Science Priorities ("Doing the Right Science")

EPA sets its science priorities through coordinated science planning, while also taking into account the particular missions and mandates of individual programs. For example, EPA uses "analytic blueprints" to plan and guide scientific analyses throughout the regulatory decision-making process. Analytic blueprints lay out the sequence and nature of the scientific analyses and data needed to inform regulatory decisions. As more complex environmental science is included in the Agency's regulatory and non-regulatory decision-making process, EPA scientists are increasingly involved throughout the decision-making process and help determine additional research and analyses needed to ensure that EPA's policies are informed by the best possible science. For complex environmental management issues requiring close coordination across multiple programs and regions, EPA may develop Agency-wide science plans to ensure that the relevant science is available to inform its decisions and actions.

The Agency's research program is designed to conduct leading-edge research and foster the

sound use of science and technology. EPA research addresses specific needs to support Agency decisions, as well as core research to understand a wide-range of environmental issues and problems. Our research direction is described in research strategies and documented as performance measures in multi-year research plans. To ensure the quality of our research program, we use a coordinated, cooperative research planning process; rigorous, independent peer review; and inter-agency partnerships and extramural grants to academia to complement EPA's own scientific expertise. This approach allows EPA to keep its leading edge in environmental research and focuses our efforts and resources on those areas where we can add the most value toward reducing uncertainty in risk assessments and enhancing environmental management.

EPA is implementing the President's Management Agenda to improve research and development (R&D) program management and effectiveness through our application of explicit R&D investment criteria. By carefully examining the relevance, quality, and performance of our research program, we are improving R&D program management, better informing R&D program funding decisions, and increasing public understanding of the possible benefits and effectiveness of the federal investment in R&D. Agency R&D programs strive to articulate *why* this investment is important, relevant, and appropriate. Programs have well-conceived plans that identify program goals and priorities and identify linkages to national and customer needs.

EPA's specific science priorities, identified in each strategic goal in a separate research/science objective, are summarized below:

- Goal 1, Clean Air, science priorities focus on emissions, fate and transport, exposures, mechanisms of injury, and health effects of criteria air pollutants. Activities include routine monitoring, air quality modeling, fuel and fuel additive toxicity testing review, and risk assessments. Air Toxics priorities include developing and improving air quality models and source receptor tools; cost-effective pollution prevention and other control options; and scientific information and tools for quantitative assessment of nationwide, urban, and residual air toxic risks. Other significant activities include analyses of the impacts of atmospheric change, the collection and analysis of solar UV monitoring data, community-based assessments, and building surveys.

- Science priorities for Goal 2, Clean and Safe Water, address water quality and drinking water. Water quality priorities focus on approaches and methods to develop and apply criteria to support designated uses and diagnose impairment and protect and restore aquatic systems. Drinking water priorities include assessing and managing risks to human health posed by exposure to regulated and unregulated chemicals and pathogens, protection of source waters, and the quality of water in the distribution system.

- The science priorities for Goal 3, Preserve and Restore the Land, focus on improving characterization, measuring, and monitoring methods; enhancing methods and models for estimating ecological effects; reducing uncertainty in human health and ecological risks; and developing more cost-effective and reliable remediation and treatment technologies.

- Goal 4, Healthy Communities and Ecosystems, science priorities are wide-ranging, and comprise a variety of priorities among multiple program offices, as well as core research. These priorities include risk assessment/management of new and existing chemicals, protection of targeted aquatic ecosystems, refinement and enhancement of human health and ecological risk assessments, characterization of global climate change, development and support of

emerging scientific advancements, and Homeland Security.

- The science priorities for Goal 5, Compliance and Environmental Stewardship, are pollution prevention practices; new technology development; socio-economics; and decision-making related to compliance, enforcement, incentives, monitoring, and innovative approaches to environmental stewardship.

In addition, EPA has identified cross-cutting science priorities that span several programs and help the Agency accomplish multiple science objectives. We have identified aggregate and cumulative risk assessment, genomics, computational toxicology, and susceptible subpopulations as high-priority cross-cutting activities. Advances in these areas will improve EPA's capability to predict and reduce human health and ecological risk under all five of the Agency's goals.

Aggregate and Cumulative Risk Assessment

Risk assessment is evolving from evaluating a single stressor in one environmental medium affecting one endpoint to considering aggregate and cumulative risk. Aggregate risk assessments consider exposure to a single stressor, such as a chemical, by multiple pathways and all relevant routes of exposure. Cumulative risk assessments describe and, where possible, quantify a wide variety of health and ecological effects from radiation, biological stressors, and chemicals. An example is the estimation of risks posed from concurrent exposure, through all relevant pathways and routes of exposure, to multiple chemicals that act the same way in the body. Cumulative assessments also consider characteristics of the population at risk. These range from individuals to sensitive subgroups which may be highly susceptible to risks from stressors or groups of stressors due to their age, gender, disease history, size, or developmental stage.

Genomics

Advances in genetic toxicology will have an enormous impact on EPA's ability to assess risk. Our initial research is focusing on the use of genomics as a tool to identify and, ultimately, to solve human and environmental problems. Genomics examines the molecular basis of toxicity and develops biomarkers of exposure, effects, and susceptibility to chemicals and other stressors. Before genomics information can be used effectively in Agency risk assessments, issues such as accuracy, reproducibility, data quality, and understanding whether a genetic change indicates an adverse effect need to be resolved. An important goal for EPA is to utilize genomics approaches to provide data for the computational modeling of toxicological pathways for single chemicals or classes of chemicals ("computational toxicology.")

Computational Toxicology

The Agency is enhancing the scientific basis and diagnostic/predictive capabilities of existing and proposed chemical testing programs by using *in vitro* or alternative approaches such as molecular profiling, bioinformatics, and quantitative structure-activity relationships (QSAR). These techniques will be used for determining genes responsible for specific mechanisms of toxicity, diagnosing patterns of genes associated with known mechanisms of toxicity, and characterizing and modeling chemical structures associated with known mechanisms of toxicity, respectively. The term "computational toxicology" refers to using these alternative approaches in conjunction with highly sophisticated computer-based models. This approach is expected to greatly reduce the use of animal testing to obtain chemical toxicity information.

Susceptible Subpopulations

The Agency conducts a continuing research program to protect the general public as well as those groups of individuals (for example, the elderly, children, and tribal peoples) who may be more sensitive/susceptible than the general population to the harmful effects of exposure to environmental agents (e.g., contaminants in drinking water). Studies conducted or supported by EPA to identify and characterize susceptible subpopulations can be described in the context of the various intrinsic (e.g., age, gender, genetic traits) or acquired (e.g., pre-existing disease, exposure) characteristics that may modify the risk of illness or disease. Studies of susceptible subpopulations typically involve multi-disciplinary research and assessments to identify a range of possible health outcomes, including cancer, reproductive toxicity, gastrointestinal illness, and other adverse health effects. Because of the importance and broad scope of this issue, EPA has established partnerships to leverage resources and capabilities with various federal and state agencies, universities, and other public or private research entities. Examples of activities at EPA include supplemental guidance to the cancer guidelines on cancer risk to children and research to focus on the elderly.

EPA Science Practices ("Doing the Science Right")

Equally important to doing the right science is doing it correctly. Sound science, as described by the Society of Environmental Toxicology and Chemistry, is "organized investigations and observations conducted by qualified personnel using documented methods and leading to verifiable results and conclusions."[1] The R&D investment criterion of quality, mentioned earlier, refers to the Agency "doing the science right." Sound science or "doing the science right" means supporting, enhancing, and implementing sound science practices and approaches, such as peer review, quality assurance, science coordination and oversight.

Peer Review

External review of scientific work products by qualified, independent knowledgeable scientists enhances credibility, uncovers technical problems, identifies additional information needs, and ensures that conclusions follow from data using generally accepted standards. The goal of the Agency's Peer Review Policy is to enhance the quality and credibility of Agency decisions by ensuring that the scientific and technical work products underlying these decisions receive appropriate levels of peer review by independent scientific and technical experts.

Quality Assurance

Quality assurance involves planning, implementation, and review of data collection activities to ensure that the data collected by, or on behalf of, the Agency is of the type, quantity, and quality needed. EPA's peer review policy and quality system are described in our Information Quality Guidelines, which outline how we maximize the quality, objectivity, utility, and integrity of our scientific information.

Science Coordination and Oversight

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[1]Society of Environmental Toxicology and Chemistry (SETAC), 1999, Sound Science Technical Issue Paper, Pensacola, FL, USA.)

The Science Policy Council (SPC) serves as a mechanism for addressing EPA's many significant science policy issues that go beyond regional and program boundaries. To integrate the policies that guide Agency decision makers in their use of scientific and technical information, the SPC works to implement and ensure the success of selected initiatives recommended by external advisory bodies such as the National Research Council and the Science Advisory Board, as well as others such as Congress, industry, and environmental groups, and Agency staff. Examples of SPC issues include: revision of the cancer guidelines to provide a current state of the art approach for determining cancer risk, harmonization of cancer and non-cancer risk assessment approaches, evaluation of toxicity testing approaches, and laboratory methods validation.

The Risk Assessment Forum (RAF) is a standing committee of senior EPA scientists. It was established to promote Agency-wide consensus on difficult and controversial risk assessment issues and to ensure that this consensus is incorporated into appropriate Agency risk assessment guidance. The RAF focuses on generic issues fundamental to the risk assessment process and related science policy issues.

Another effort to ensure Agency dialogue and coordination is the Council for Regulatory Environmental Modeling (CREM). The CREM was established to promote consistency and consensus between environmental model developers and users.

Meeting the Challenge

EPA intends to meet the challenge of advancing environmental science, and the use of this science in our decisions, through continued and enhanced collaboration with states, tribes, and federal and international partners, and by measuring our performance through the use of environmental indicators and other measures.

Tribal Partnerships

The Tribal Science Council (TSC) represents a new paradigm for how the Agency works with tribal governments. The mission of the TSC is to provide a forum for interaction between tribal and Agency representatives to work collaboratively on environmental scientific issues including research, monitoring, modeling, information, technology, and training in Indian country. In conjunction with our tribal partners, the Agency is exploring a new approach, Health and Well Being, that incorporates the cultural interconnectedness between tribes and the natural world into assessments and uses health and well being of the environment and people as its foundation. The TSC is committed to the development of sound cross-media scientific approaches to support the tribal cultural values and traditional ways of life and the availability of a healthy environment for present and future generations.

Other Federal Partners

Our emphasis on building partnerships also extends to our relationships with other federal agencies. EPA has ongoing partnerships with many federal agencies engaged in environmental research. We actively participate in the Committee on Environment and Natural Resources (CENR) of the National Science and Technology Council, which was established to foster and implement a coordinated multi-agency and interdisciplinary focus for federal environmental R&D. Through partnerships with CENR members such as the Departments of Energy, Agriculture, and the Interior; the National Institute of Health; the National Oceanic and Atmospheric Administration; the National

Science and Technology Council; and the Committee on Environmental Quality, as well as other nonmembers, we can stay abreast of emerging technologies, evaluate new approaches, and provide a broad knowledge base to inform EPA decisions.

The Result

EPA's approach to conducting and using science in service to the Agency's mission will ensure that Agency policies, decisions, and other activities reflect high-quality scientific information relevant to current and future environmental issues. We will accomplish this goal by ensuring that we work together, both across the Agency and with our partners, to identify the highest priority science activities and that our work meets the highest standards of scientific excellence.

Homeland Security

The terrorist attacks of September 11, 2001, followed shortly by the deliberate use of anthrax to contaminate public buildings, brought into sharp focus the important role the EPA has to play in helping America meet and defeat the threat of terrorism. EPA's role in environmental monitoring and remediation in lower Manhattan, along with its efforts to decontaminate the Hart Senate Office Building and other facilities on Capitol Hill, revealed the extent to which EPA would be on the front lines in the war against terrorism.

EPA's mission is clear: to protect human health and the environment. In pursuing this mission, EPA has developed certain unique scientific and technical expertise and possesses additional capabilities which complement those of other federal agencies, including the new Department of Homeland Security.

The events of September 11 and thereafter led EPA to reassess those capabilities relative to national security and to determine whether these capabilities can be enhanced to better protect the American people. At Administrator Whitman's direction, the Agency developed a Strategic Plan for Homeland Security, which was released publicly in September 2002.

EPA's Homeland Security Strategic Plan is intended to provide guidance and direction to the Agency as it seeks to integrate its homeland security responsibilities into its traditional mission. It reflects certain responsibilities given to the Agency under such laws as the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, several Presidential Decision Directives, as well as in the President's July 2002 National Strategy for Homeland Security.

Organizing the Work

EPA's homeland security efforts are centered around four main areas of responsibility:

1. Critical Infrastructure Protection
2. Preparedness, Response and Recovery
3. Communication and Information
4. Protection of EPA Personnel and Infrastructure.

Each of these areas draws on expertise already possessed by EPA and expands on that experience to meet the challenges faced in protecting the Nation against the terrorist threat.

Critical Infrastructure Protection

Under the National Strategy for Homeland Security, the EPA is named the lead federal agency for the protection of two of the Nation's critical infrastructure sectors: the Water sector and the Chemical Industry and Hazardous Materials sector.[2] In addition, the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 gives EPA specific responsibilities for promoting the security of the Nation's public drinking water infrastructure.

These missions draw on EPA's unique programmatic responsibilities and expertise related to the drinking water and wastewater industries and the use, handling, storage, release, and disposal of chemicals and chemical wastes at industrial facilities. In addition, EPA's experience with air monitoring and indoor air quality issues have resulted in it being given the lead by the then-Office of Homeland Security at the White House for the Biowatch system being put in place in various cities across the country to monitor for airborne release of certain biological contaminants.

In these areas, EPA is committed to assessing and reducing vulnerabilities and strengthening detection and response capabilities for critical infrastructures. In addition, EPA will contribute to similar efforts by other federal departments and agencies adressing food, transportation, and energy, and will provide environmental expertise to support federal law enforcement activities. Among EPA's program offices involved in this area are the Office of Solid Waste and Emergency Response (OSWER), the Office of Water (OW), the Office of Research and Development (ORD), the Office of Air and Radiation (OAR), and the Office of Prevention, Pesticides, and Toxic Substances (OPPTS).

Critical Infrastructure Protection Goals

1. EPA will work with the states, tribes, drinking water and wastewater utilities (water utilities), and other partners to enhance the security of water and wastewater utilities.

2. EPA will work with the states, tribes, and other partners to enhance security in the chemical and oil industry.

3. EPA will work with other Federal agencies, the building industry, and other partners to help reduce the vulnerability of indoor environments in buildings to chemical, biological, and radiological (CBR) incidents.

4. EPA will help to ensure that critical environmental threat monitoring information and technologies are available to the private sector, Federal counterparts, and state and local governments to assist in threat detection.

5. EPA will be an active participant in national security and homeland security efforts pertaining to food, transportation, and energy.

6. EPA will manage its Federal, civil, and criminal enforcement programs to meet our

[2]National Strategy for Homeland Security, July 2002, page 32

homeland security, counter-terrorism, and anti-terrorism responsibilities under Presidential Decision Directives (PDD) 39,62, and 63 and environmental, civil, and criminal statutes.

Preparedness, Response and Recovery

Under the National Strategy for Homeland Security and various Federal response plans, EPA has specific response and recovery responsibilities. As the Agency's experiences since September 11 have made clear, the Agency should expand and enhance its ability to provide response and recovery support to any future terrorist events. Under this goal, EPA will focus on strengthening and broadening its response capabilities, clarifying its roles and responsibilities to ensure an effective response, and promoting improved response capabilities across government and industry in the areas in which the Agency has unique knowledge, experience, and expertise. Among the program offices involved in this effort are OSWER, OPPTS, and ORD.

Preparednes, Response, and Recovery Goals

1. EPA will be prepared to respond to and recover from a major terrorist incident anywhere in the country. To do this, the Agency will maintain trained personnel and effective comunications, ensure practiced coordination and decision-making, and provide the best technical tools and technologies to address threats.

2. EPA will communicate to federal, state, and local agencies the Agency's roles, responsibilities, authorities, capabilities, and inter-dependencies under all applicable emergency plans consistent with the National Strategy for Homeland Security and efforts undertaken by the new Department of Homeland Security. The Agency will also understand the roles, responsibilities, authorities, capabilities, and inter-dependencies of its partners.

3. EPA will support and develop the preparedness of state, local, and tribal governments and and private industry to respond to, recover from, and continue operations after a terrorist attack.

4. EPA will advance the state of the knowledge in the areas relevant to homeland security to provide first responders and decision-makers with tools and the scientific and technical understanding they need to manage existing or potential threats to homeland security.

Communication and Information

Comprehensive, accurate, well-organized, and timely information is critical to sound decision making internally and to maintaining public confidence in times of threat. EPA possesses unique capabilities to collect, synthesize, interpret, manage, disseminate, and provide understanding to complex information about environmental and human-made contaminates and the condition of the environment. Effectively managing and sharing this information within the Agency, among its partners at all levels of government, with the private sector, and with academia will contribute to the Nation's capability to detect, prepare for, prevent, protect against, respond to, and recover from terrorist incidents. Among the program offices involved in this effort are OEI and OARM.

Communication and Information Goals

1. EPA will use reliable environmental information from internal and external sources to ensure

informed decision-making and appropriate response.

2. EPA will effectively disseminate timely, quality environmental information to all levels of government, industry, and the public, allowing them to make informed decisions about human health and the environment.

3. EPA will exchange information with the national security community to prevent, detect, and respond to terrorist threats or attacks.

4. EPA will continually and reliably communicate with employees and managers.

Protection of EPA Personnel and Infrastructure

The security and protection of its own personnel and infrastructure are critical to ensuring EPA's ability to respond to terrorist incidents as well as continue to fulfill its mission. In recognition of this and in light of the new environment under which we work, EPA is undertaking steps to further safeguard its staff, ensure the continuity of its operations, and protect the operational capability of its vital infrastructure assets. Offices involved in this effort include OARM, OSWER, OECA, and OEI.

Protection of EPA Personnel and Infrastructure Goals

1. EPA will safeguard its employees.

2. EPA will ensure the continuation of the Agency's essential functions and operations.

3. EPA will maintain a secure technology infrastructure capable of supporting lab data transport and analysis functions, 24x7 telecommunications to all EPA locations, and management of critical data and information.

4. EPA will ensure that the Agency's physical structures and assets are secure and operational.

Coordinating the Effort

The Agency's homeland security efforts are very much an extension of its traditional mission and involve a number of its program offices. To coordinate these efforts, the Administrator has established with the Office of the Administrator, the EPA Office of Homeland Security. This office will serve as the central coordinating body in the Agency for homeland security and will be responsible for monitoring the implementation of the Agency's Homeland Security Strategic Plan. The Office will also serve as a single point of entry for homeland security matters with other federal departments and agencies.

Working with the Department of Homeland Security and other Partners

With the creation of the new Department of Homeland Security, the federal government now has one organization responsible for coordinating the efforts of the various federal departments and agencies involved with homeland security. EPA will be an important partner with the new Department, working with it on a host of homeland security issues, including critical infrastructure protection, research, and response and recovery. That partnership necessarily means the new Department will be

working with numerous program offices and regional offices, continuing the efforts initiated by the former White House Office of Homeland Security. EPA's Office of Homeland Security will be responsible for ensuring that the Agency's various external efforts are properly coordinated and receive clear direction from the Office of the Administrator and other senior leadership.

Measuring Performance

EPA's Homeland Security Strategic Plan not only lays out the Agency's goals for meeting its homeland security mission, it also enumerates tactics for reaching those goals and states the specific results the Agency should expect to achieve. EPA's Office of Homeland Security will be ensuring that the Agency's homeland security goals are being carried out across the Agency.

The Result

Through implementation of the Agency's Homeland Security Strategic Plan, EPA will ensure that it has the capability to meet its homeland security mission without compromising its ability to meet its traditional mission. By keeping the operational aspects of the Plan in existing programs (as opposed to creating a new homeland security program office), the Agency should realize numerous cross-cutting benefits from its homeland security work.

For example, work done to enhance detection technologies against chemical or biological contaminants that could be deliberately introduced into a water supply to create a public health risk may prove useful in detecting naturally occurring contaminants. Similarly, efforts to enhance our response capacity to meet the challenges of several simultaneous terrorist acts could help the Agency respond more effectively to an accidental event, such as an accidental release at a chemical facility.